



Flag raising

Learn how the American flag was readied for its trip to the Moon on board Apollo 11. Story on Page 3.



Sing along

Youngsters enjoy space-themed music during a special concert in Teague Auditorium. Photo on Page 4.

Space News Roundup

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Science mission collects data on life, materials

By Eileen Hawley

Columbia was scheduled to return to Florida this morning ending the second International Microgravity Laboratory mission.

During the mission the seven crew members — Commander Bob Cabana, Pilot Jim Halsell, Payload Commander Rick Hieb, Mission Specialists Leroy Chiao, Don Thomas and Carl Walz, and Japanese Payload Specialist Chiaki Mukai — studied the effects of microgravity on a variety of lifeforms and materials, including red-bellied newts and Japanese Medaka fish.

The Medaka is a freshwater fish found throughout the Japanese countryside. Its relatively short lifespan and transparent body makes it easy for the astronauts to observe the development of the Medaka embryo and determine if microgravity affects the process.

The red-bellied newts also produced offspring in orbit, although two of the adult female newts died during the mission. The newborn newts were studied to observe the effect of microgravity on cells during early stages of development.

Crew members also took time to salute the 25th anniversary of the Apollo 11 lunar landing during an on-board ceremonies Wednesday. The astronauts acknowledged the landing of the lunar module Eagle and Neil Armstrong's first steps on the Moon on July 20, 1969.

Hieb spent time Sunday performing maintenance on the Japanese space agency's Free Flow Electrophoresis Unit that had been plagued with air bubbles in the unit's cooling system. The air bubbles caused the unit to overheat, automatically turning itself off and limiting the science that could be conducted. With help from Halsell, Hieb replaced all the water in the FFEU's cooling system three times in an attempt to flush out the air bubbles. The FFEU performed to specifications following the third maintenance procedure.

Also on Sunday, the crew received a congratulatory phone call from NASA Adminis-

trator Dan Goldin. Goldin praised the crew for its hard work saying it would help lay the groundwork for future space exploration.

As the mission passed the half-way point, Chiao began experiments in the Electro-magnetic Containerless Processing Facility, or TEMPUS, allowing ground researchers to study a sphere of nickel and carbon alloy, which was undercooled, or solidified at a temperature below normal for this alloy. Chiao also used the TEMPUS facility to melt, levitate and undercool a sample of iron and nickel.

Mukai used the NIZEMI slow-rotating centrifuge in an experiment designed to help researchers determine gravity thresholds of metal alloys. That information may be used to find other methods, including electromagnetic forces, to suppress fluid flows during processing on semiconductors or other metals on Earth, making them more homogenous.

Cabana and Halsell spent time with the Performance Assessment Workstation, a laptop computer that uses a battery of performance tests to determine crew members' mental ability to perform operational tasks during long-duration missions.

Columbia proved to be a near-flawless science platform throughout the 14-day mission with no major problems tracked by ground controllers.

Late in the mission, ground controllers were tracking a problem with a series of error messages received from one of *Columbia*'s three inertial measurement units, which provide guidance information for the on-board computers. Flight controllers studying the messages determined that the IMU was functioning well and capable of providing data needed to land the shuttle.

The STS-65 crew is scheduled to return to Ellington Field about 10 hours after landing. For the latest information on crew return, call the Employee Information Service line at x36765.



Goldin stresses challenge

NASA Administrator Daniel Goldin visited JSC this week speaking to space station team members about the program and recent successful appropriations vote in the House of Representatives.

Goldin was joined by JSC Director Dr. Carolyn Huntoon, Deputy Associate Administrator, Space Station Wilbur Trafton, and Space Station Program Manager Randy Brinkley.

Brinkley briefly discussed the challenges facing the program in the upcoming year as it prepares for a first element launch in November 1997 and acknowledged the personal effort expended by Goldin during the recent vote.

"We all should recognize the personal effort Mr. Goldin put forth in leading the vote," Brinkley said. "We moved from last year's one vote margin to where we are today."

"The past six months probably have been the most challenging in my career, and Mr. Goldin says we are going to stay on schedule and we are going to have that first element launch even if it means I'm strapped to the back of a rocket," Brinkley said.

Goldin then offered Brinkley his assurances that targeted first element launch would be met.

"We face another significant vote in the Senate no later than July 21," Goldin said, "and I am cautiously optimistic they will understand the importance of the space program not just for the future of America, but the future of the world."

Goldin reminded employees that as we look back at the triumph of the Apollo 11 mission 25 years ago, to remember that many people did not believe that mission would succeed.

"America 25 years ago was facing a crisis in the space program," Goldin said. "We think about the past fondly, but before the launch it wasn't clear that Apollo would make it. It's amazing how many people are uncertain before the launch, and after the successes they say how wonderful it was. But they forget about the hard work that created that success."

The success of space station in the House appropriations vote can be attributed to the hard work of all NASA employees, Goldin said.

"It was not what I did, but what you did," Goldin said. "We made

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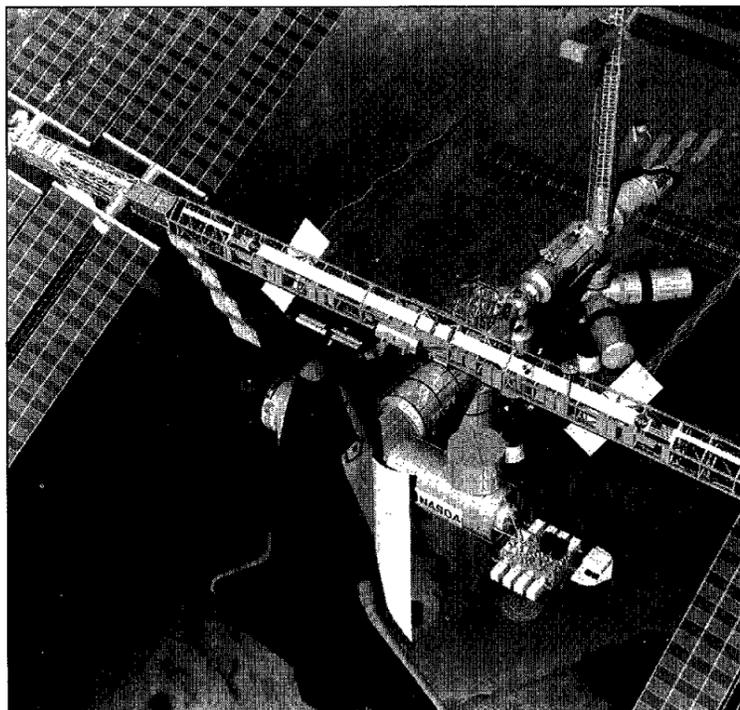


Illustration by John Frasanito

SPACE STATION — This artist's illustration reflects how the orbiting science platform will look when it is fully assembled in 2002. The small truss that will support the solar panels providing early science capability for the station can be seen mounted on the U.S. node behind the main horizontal truss. The solar panels are moved to the extreme ends of the station in this final configuration.

Space station to receive science capability early

The Space Station Control Board met at JSC July 12, approving a revised assembly sequence that provides significantly more power for the United States laboratory, provides an earlier U.S. capability for essential space station systems and produces hardware in an efficient and cost effective manner while still meeting the \$2.1 billion annual spending cap.

Space station officials began work on a revised assembly sequence several months ago to address administration and congressional concerns about power and U.S. capability to provide redundancy for critical station systems early in the assembly sequence.

"We believe this assembly sequence satisfies those concerns," said Randy Brinkley, space station program manager. "And it does it in a way that is good for the program." Brinkley said the revised assembly sequence will result in key improvements including achieving a schedule that produces hardware efficiently within the annual funding

constraint; reducing risk by relying on a well defined U.S. photovoltaic array module to provide electrical power for the space station; and increasing from 8 kilowatts to 13 kilowatts the average maximum power that is available to the U.S. lab when it is delivered to the space station. This is critical to the user community as some high power experiments now may be flown earlier.

Brinkley said a number of factors drove the revised assembly sequence.

"We wanted to increase the amount of power available for the U.S. lab, establish an earlier U.S. capability for essential station systems, and stay within the funding cap, all of which we accomplished," Brinkley said, "When we laid all those changes out, it forced us to delay slightly the launch of the laboratory module. But we think this was a reasonable trade and will actually provide a larger payoff in the long run. We determined it was better to have sufficient power to run the lab,

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Comet collision impresses

Astronomers around the world marveled this week as fragments of Comet P/Shoemaker-Levy 9 pelted the southern hemisphere of Jupiter, producing an unrivaled cosmic fireworks show for Earth- and space-based telescopes.

The impacts created huge fireballs with more energy that the world's total nuclear arsenal could produce and left black smudges larger than the Earth.

The comet's three discoverers — Eugene and Carolyn Shoemaker and David Levy — said the pattern for the impacts is for a fireball to rise hundreds of miles above Jupiter's clouds, then spread out and cool, leaving a pancake-like smudge visible in Earth-based telescopes.

"The spots are about as big as Jupiter's red spot, which is about twice the size of Earth," said Eugene Shoemaker, a U.S. Geological Survey scientist.

By today, all 21 comet fragments were expected to have hit the side of Jupiter that is turned away from the Earth at a velocity of 134,000 miles an hour, but the effects of the collisions were clearly seen as the impact sites rotated into view.

However, the orbiting Hubble Space Telescope sent back clear images of the aftermath of the collisions taken using its new Wide Field

Planetary Camera-2 instrument, and observatories around the world shared their images in a variety of spectra.

Hubble images taken Tuesday showed three dark dots in a line in Jupiter's southern hemisphere representing the remains of fragments A, C and E.

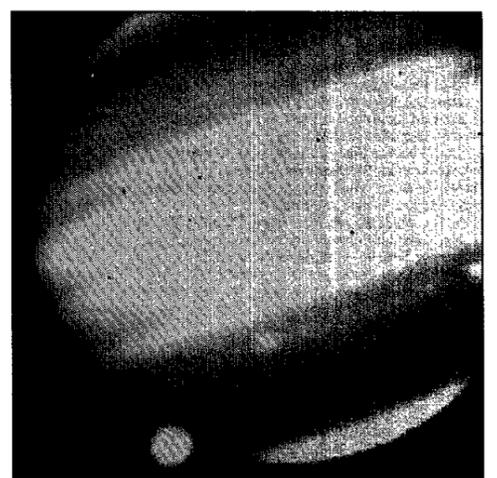
One of the largest fragments, labeled G, struck the gas giant's atmosphere Tuesday with a force estimated at 6 million megatons, creating a dark, well-defined circle and a smudge resembling a black eye. Shoemaker said that had fragment G hit Earth, the crater would have been the size of Rhode Island and the impact would have blanketed the planet with a fine layer of dust that would blacken the Sun.

"The energy released is beyond any of our experiences on Earth," said Lucy McFadden, an astronomer at the University of Maryland.

Three more fragments hit nearly the same spot over a 20-hour period on Wednesday, producing a spectacular triple whammy.

"None of this stuff is anything we had expected to see," said Heidi Hammel of the Massachusetts Institute of Technology. "You'll have three — boom, boom, boom. You are going to have one heck of a mess."

Scientists hoped to learn more about the chemical content of Jupiter's atmosphere, as well as the wind speed and direction of Jupiter's



A fireball larger than Earth burst into view as fragment G of the comet Shoemaker-Levy 9 hit the giant planet Jupiter at 2:28 a.m. CDT July 18. All 21 of the comet pieces hit Jupiter's backside out of view of the Earth.

upper atmosphere. They also were watching for the production of new molecules or ions, but had yet to see some of their predictions — such as the appearance of water — come true.

The Galileo probe had a line-of-site view of the collisions and has begun sending back data. That data, however, won't be massaged into images for several months.

JSC

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Store from 10 a.m.-2 p.m. Monday-Thursday and 9 a.m.-3 p.m. Friday. For more information, call x35350 or x30990.

Astros Tickets: Tickets available for Aug. 10 Astros vs. San Diego Padres game. Game is at 7:05 p.m. Cost is \$12.75 for field level seats. Last day to purchase tickets is July 27.

Six Flags: Tickets available for one-day weekend and weekday admission. Cost is \$20.95 for weekend and \$16.75 for weekday. Two-day admission, either weekend or weekday, is \$27.25.

Seaworld of Texas: Discount tickets: adult \$20.95; child (3-11), \$14.25.

Fiesta Texas: Discount tickets: adult \$18.95; child (4-11) and seniors (55+), \$14.25. Special price of \$14.25 for tickets purchased between July 25-30.

Splash Town: Discount tickets, \$11.05.

Waterworld: Discount tickets, \$10.50.

Astroworld: Discount tickets: adult \$13.75.

Moody Gardens: Discount tickets for two of three different attractions: \$9.50

Space Center Houston: Discount tickets: adult, \$8.75; child (3-11), \$7.10; commemorative, \$9.55.

Metro tickets: Passes, books and single tickets available.

Movie discounts: General Cinema, \$4.75; AMC Theater, \$4; Loew's Theater, \$4.50.

Stamps: Book of 20, \$5.80

JSC history: *Suddenly, Tomorrow Came: A History of the Johnson Space Center*, \$11.

JSC

Gilruth Center News

Sign up policy: All classes and athletic activities are first come, first served. Sign up in person at the Gilruth Center and show a NASA badge or yellow EAA dependent badge. Classes tend to fill up two weeks in advance. Payment must be made in full, in exact change or by check, at the time of registration. No registration will be taken by telephone. For more information, call x30304.

EAA badges: Dependents and spouses may apply for photo identification badges from a.m.-9 p.m. Monday-Friday; and 8 a.m.-4 p.m. Saturdays. Dependents must be between 16 and 23 years old.

Weight safety: Required course for employees wishing to use the weight room is offered from 8-9:30 p.m. July 26. Pre-registration is required. Cost is \$5.

Defensive driving: Course is offered from 8:15 a.m.-3 p.m. Saturday. Next class is Aug. 6. Cost is \$19.

Aerobics: High/low-impact class meets from 5:15-6:15 p.m. Tuesdays and Thursdays. Cost is \$32 for eight weeks.

Exercise: Low-impact class meets from 5:15-6:15 p.m. Mondays and Wednesdays. Cost is \$24 for eight weeks.

Aikido: Martial arts class meets from 5-7:30 p.m. Tuesdays and 6:15-8:15 p.m. Wednesdays. Black Belt class from 6-8 p.m. Fridays, requires instructor permission. Cost is \$25 per month. New classes begin the first of each month.

Country Dancing: Classes meet Mondays. Beginners class meets from 7-9 p.m.; advanced class meets from 8:30-10 p.m. Partners are required. For additional information, contact the Gilruth Center at x33345.

Golf Lessons: Lessons for all levels. Cost is \$90 for six weeks. For additional information, contact x33345.

Fitness program: Health Related Fitness Program includes a medical examination screening and a 12-week individually prescribed exercise program. For more information, call Larry Wier at x30301.

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Dates & Data

Today

Cafeteria menu — Special: meat sauce and spaghetti. Total Health: spaghetti noodles with turkey meat sauce. Entrees: rainbow trout, liver and onions, been cannelloni, pork and shrimp egg roll, Reuben sandwich. Soup: seafood gumbo. Vegetables: steamed broccoli, breaded okra, cut corn, black-eyed peas.

Monday

Cafeteria menu — Special: turkey and dressing. Total Health: herb flavored steamed pollock. Entrees: breaded veal outlet, beef chop suey, steamed pollock, beef cannelloni, French dip sandwich. Soup: beef and barley. Vegetables: Brussels sprouts, mixed vegetables, egg plant casserole, winter blend vegetables.

Tuesday

Cafeteria menu — Special: pepper steak. Total Health: barbecue chicken. Entrees: baked lasagna, pork chop and fried rice, turkey a la king, baked chicken, French dip sandwich. Soup: black bean and rice. Vegetables: breaded squash, steamed spinach, baby carrots, navy beans.

Wednesday

Cafeteria menu — Special: Mexican dinner. Total Health: steamed pollock. Entrees: broccoli cheese quiche, catfish and hush puppies, spare ribs and sauerkraut, steamed fish, Reuben sandwich. Soup: seafood gumbo. Vegetables: Spanish rice, pinto beans, peas, broccoli.

Thursday

Cafeteria menu — Special: hamburger steak with onion gravy. Total Health: spicy new potatoes. Entrees:

corned beef, cabbage and new potatoes, chicken and dumplings, meat ravioli, French dip sandwich. Soup: broccoli cheese and rice. Vegetables: navy beans, cabbage, cauliflower, green beans.

Friday

Cafeteria menu — Special: tuna noodle casserole. Total Health: broiled chicken breast. Entrees: deviled crabs, broiled pollock, liver and onions, broiled chicken with peach half, Reuben sandwich. Soup: seafood gumbo. Vegetables: Italian green beans, cauliflower au gratin, steamed rice, vegetable sticks.

August 8

NMA Class — The Texas Gulf Coast Council of the National Management Association will host a 10-hour "Successful Money Management Seminar" from 6-9 p.m. Aug. 8, 15 and 22. Cost to attend is \$50 per couple for members, \$75 for non-members. For additional information, contact Richard Hergert, 280-0444.

August 10

PSI meets — The Clear Lake/NASA Area chapter of Professional Secretaries International meets at 5:30 p.m. Aug. 10 at the Holiday Inn on NASA Road 1. For additional information, contact Elaine Kemp, x30556 or Diana Peterson, x33077.

August 21

Chorus auditions — The Bay Area Chorus will hold auditions for the Fall 1994 season from 3-5 p.m. Aug. 21 at Clear Lake Presbyterian Church, 1511 El Dorado Blvd. For an appointment, call 684-6030.

Sept. 5

Labor Day — Most JSC offices will be closed in observance of the Labor Day Holiday.

Sept. 14

PSI meets — The Clear Lake/NASA Area chapter of Professional Secretaries International meets at 5:30 p.m. Sept. 14 at the Holiday Inn on NASA Road 1. For additional information, contact Elaine Kemp, x30556 or Diana Peterson, x33077.

Oct. 10

Columbus Day — Most JSC offices will be closed in observance of the Columbus Day Holiday.

Oct. 12

PSI meets — The Clear Lake/NASA Area chapter of Professional Secretaries International meets at 5:30 p.m. Oct. 12 at the Holiday Inn on NASA Road 1. For additional information, contact Elaine Kemp, x30556 or Diana Peterson, x33077.

Nov. 9

PSI meets — The Clear Lake/NASA Area chapter of Professional Secretaries International meets at 5:30 p.m. Nov. 9 at the Holiday Inn on NASA Road 1. For additional information, contact Elaine Kemp, x30556 or Diana Peterson, x33077.

Nov. 11

Veterans Day — Most JSC offices will be closed in observance of the Veterans Day Holiday.

Nov. 24

Thanksgiving Day — Most JSC offices will be closed in observance of the Thanksgiving Day Holiday.

Dec. 14

PSI meets — The Clear Lake/NASA Area chapter of Professional Secretaries International meets at 5:30 p.m. Dec. 14 at the Holiday Inn on NASA Road 1. For additional information, contact Elaine Kemp, x30556 or Diana Peterson, x33077.

Swap Shop

Property

Lease: Condo on Clear Lake, 2-1, cov parking, gym, pool, security, tennis, \$650/mo incl utilities. 480-5583 or 482-7156.

Sale: Lake Livingston lot, 30' x 70', paved roads, utilities avail, \$3k negotiable. Wait, 422-6369 (Baytown).

Lease: CLC, 1BR condo, W/D conn, FPL, appl, microwave, avail 7-11. Jim Briley, 244-4632 or 488-7901.

Sale: Forest Park East, Friendship Section, 6 cemetery spaces, near chapel, all privileges, \$5.9k. 488-7852.

Sale: Clear Lake waterfront condo, tri-level, 2-2-5-2, decking over water, patio, wet bar, FPL, formal DR, ceiling fans, \$89,750. 334-3101.

Lease: 1 week vacation at timeshare condo, anywhere in U.S. depending on availability, \$250; some foreign countries, \$450, full kitchen or partial, no transportation. x34354.

Sale: Clear Lake waterfront condo, tri-level, 1-1, vaulted ceiling w/skylight in LR, FPL, ceiling fans, new appliances, \$48,250. 334-3101.

Sale: Friendswood, 4-2-2, approx 2100 sq ft, new flooring throughout, new roof, 1/3 acre landscaped lot, \$123.5k. Mark, x38013 or 992-4132.

Sale: 2-Four-plexes, 2BDR, 2 patios/ea, \$118k/ea. Dan Bennett, 388-1095.

Lease: Piper's Meadow, large 3-2-2A, fenced, deck, FPL, HI-efficiency A/C, \$870/mo. x31275 or 486-0315.

Sale/Sale: Bay Glen, 3-2-2, 1850 sq ft, very attractive, \$975/mo/\$110k. 286-2011.

Sale/Lease: University Green town home, 2-2-2, \$69.5k or \$750/mo. Ric, 853-3159 or 840-1037.

Rent: Heritage Park, 3-2-2, 1700 sq ft, new floor/carpet & A/C, \$800/mo + dep. Sonny, x38533 or 474-4198.

Lease: Pebble Brook, 1-1, W/D, refig, FPL, corner downstairs unit, \$395/mo + dep & ref. Tom, 335-1514.

Sale: Middlebrook, 4-2-2, 2050 sq ft, FPL, new CA/H, new roof, make offer. 480-6639.

Lease: Galveston Seawall condo, 1 BR, fully furnished, 6 mo lease or more, \$450/mo + util. x30737.

Sale: Oakbrook West, 4-2-2, completely updated, reduced to \$94.5. Denise, 486-5146.

Sale: Property, 1.9 acres, Point Blank, TX. 326-2307.

Lease: Clear Lake condo, 2-1, covered parking, gym, pool, security, \$650/mo + util. 480-5583 or 482-7156.

Lease: Condo in Clear Lake, 2-1, covered parking, gym, pool, security, tennis, \$650/mo including util. 480-5583 or 482-7156.

Cars & Trucks

'90 Toyota Tercel, ex cond, red, blk/gray int, 5 spd, AM/FM/cass, A/C, 2 dr, 56k mi, 1 owner, \$4.5k. 534-2667.

'86 Nova, sunroof, AM/FM/cass, no A/C, \$900 OBO. Dave, x36027.

'86 Hyundai Excel GLS, 2 dr hthcbk, A/C, sunroof, needs minor work, \$850 OBO. 639-4144.

'79 Ford PU, 6 cyl, step side, rebuilt motor, auto trans, A/C, new tires, needs paint, \$1.5k. 445-6240.

'88 Taurus SW, fully equipped, new tires, \$4,250. x35263 or 481-2733.

'81 VW Rabbit LS, good condition, \$700. 482-5210.

'84 Nissan 300ZX, black ext, ex cond, \$3.2k OBO. 483-0737.

'92 Dodge Shadow, white, 4-dr, auto, A/C, radio, \$5.3k. 337-3222.

'84 Nissan 300 ZX Turbo, 2-seater, 73k mi, leather, very clean, \$4.5k. x34723 or 326-4968.

'87 Hyundai Excel, 4-dr hthcbk, 4 spd, 101k mi, A/C, AM/FM/cass, runs well, \$1k. Sarah, 486-2164 or 559-1327.

'88 Ford Mustang LX, 5 spd, 4 cyl 2.3, 2-dr hatch, white, \$2k OBO. Gero, x33607 or 480-7150.

'88 Porsche 944 Turbo S, blk/tan, 60k mi, 247 hp, \$15k. 863-7245.

'85 Subaru wagon, 5 spd, A/C, 133k, good cond, \$1,240. 409-925-7839.

'90 Mitsubishi Eclipse, GS-DOHC, auto, A/C, alarm, cruise, pwr locks/windows, AM/FM/cass, sunroof, 43k mi, ex cond, \$9k. Tom, 244-5491 or 280-9105.

'90 Honda Prelude, 2 dr, 5 spd, 60k mi, nice. x31384 or

487-2383.

'82 Toyota Cressida, loaded, 145k mi, ex cond, \$3k. David, x45136 or 488-5888.

'83 Nissan Sentra, good cond, 100k mi, \$2k. David, x45136 or 488-5888.

'93 Mazda 929, Ivory/taupe, 13k mi, Gold pkg, CD, tint, fully loaded, \$40k new, sell \$28.2k. 480-0903.

'91 GT Mustang, ex cond, \$1k and take up notes. Henry, x36973 or 409-765-8453.

'90 Toyota Tercel, ex cond, red, blk/int, 5 spd, AM/FM/cass, A/C, 2 dr, 56k mi, \$4.5k. 534-2667.

'86 Nova, sunroof, AM/FM/cass, no A/C, \$900 OBO. Dave, x36027.

'86 Hyundai Excel GLS, 2 dr hthcbk, A/C, sunroof, needs minor work, \$850 OBO. 639-4144.

'79 Ford PU, 6 cyl, step side, auto, A/C, need paint, \$1.5k. 445-6240.

'84 Honda Civic, 4 dr, 5 spd, blk, \$2.5k. Wade, 335-2259.

'86 Nova, 4 dr, sunroof, AM/FM/cass, \$900 OBO. Dave, x36027.

'86 Ford Custom van, 62k mi, ex cond, \$7.5k. x30122.

'85 Suburban auto, tint, dual A/C, 105k mi, good cond, \$5k. Bob, 480-8608.

'91 Ford "Eddie Bauer" Explorer, forest green/beige, 39k mi, loaded, sunroof, ex cond, \$15,950 neg. 660-6647.

'82 Corvette, collectors ed, ex cond, all orig. Jim, 532-2218.

'85 1/2 Porsche 944, ex cond, red. Jim, 532-2218.

'87 Astro minivan, dual air, seats 7, 103k mi, good cond, \$4.5k. 538-3434.

'88 Ford Ranger XLT PU, 5 spd, A/C, V6, Brahma top, 68k mi, \$4k. Clarence, x37160 or 326-3463.

'82 Chevy Conversion van, AM/FM/cass, auto, good cond, \$1,450. Patricia, x34911 or 335-8702.

'83 Fiero, 91k mi, rebuilt engine, \$2.3k. Don, 244-5718.

'90 Jeep Cherokee, 4x4, navy, top pkg, 60k mi, ex cond, \$11.3k. Les, x38633 or 992-1805.

'81 Oldsmobile Cutlass Supreme, 89k mi, V8, 2 dr, power, A/C, \$1,825. Greg, x48646 or 474-3668.

'85 Ford 150 Supercab, 1/2 ton PU, \$2.5k. 334-2379.

'88 Toyota 4-Runner, V6, red, 4WD, auto, A/C, cass, \$12k. Jeff, x38424 or 331-7166.

'90 Ford F350 dually supercab, 7.3 liter diesel, 58k mi, new paint, \$13.5k. Daisy, 409-925-2944.

Boats & Planes

'92 Baymaster 18'6", 115hp Johnson, detachable tongue trlr, garaged, ex cond, Motorguide salt water trolling motor, fish finder/depth sounder, \$10.5k. Steve, x47698 or 482-3896.

22.5' Sea Ray, 228hp Mercruiser, new Alpha One I/O, VHF, color depth sounder, rigged for offshore, \$6.5k. Mark, x38013 or 992-4132.

'8 Sailing dingy, sails/oars, ex cond, \$650. Robinson, x30454 or 532-3013.

'16' Jon boat, 25 hp Johnson, trolling motor, bass seats, \$700. Ted, 282-4874 or 474-9569.

Sunfish sailboat w/galv trailer, \$700. x48121 or 488-7137.

'75 Glastron 15' ski boat, 70 hp Johnson motor, good cond, \$1.2k. 992-5226.

'17 heavy-duty aluminum canoe w/2 paddles, ex cond, \$300. Pat, x35180 or 326-3706.

Wet Jet brand jet ski, 432 cc engine, 2-person watercraft, sportsman galvanized trlr, custom cover, \$5k. Judy, x33626 or 559-2331.

'8 aluminum, semi-v, boat & trailer, \$300. Linda, 282-2810 or 554-6138.

Cycles

Mountain bike, Bianchi Grizzly, 21.5", Rock Shox Mag 21 shock fork, Shimano XT, Shimano DX components, ONZA bar ends, Benrager seat, \$675. Arlene, x37150 or 488-6156.

His/Her 10 spd bikes, fair to good cond, need tires, \$125/both OBO. Leah/Richard, x39283 or x32230.

Boys bike, 16". Mike, x34710.

Audiovisual & Computers

Computer 386 DX 25 mhz, 4 MB RAM, 90 MB HD, 3.5" & 5 1/4" FD, SVGA monitor & card, \$600. Chad, x35786 or 482-9263.

Phase Linear studio monitors, still in box, 250 watts speakers, \$235/pr. Mark, x48120 or 326-1526.

Nintendo games, Tetris, Goonies II, Krypton Conquest, Dream Master, Ninja II, \$15/ea. Marie, 992-5535.

RCA Camcorder VHS, all accessories, \$425. Howard, 280-7409 or 486-6183.

388 SX, 2 MB RAM, 40 MB HD, mono monitor, 101 keyboard, \$350. Jeff, x34180 or 486-5806.

Rockford Fosgate amp, 60 DSM & Savard Punch 10" subwoofer, new, \$250 neg. Kristen, x35506 or 334-1876.

Canon-Bubble jet, (BJ-200) printer, \$200. Richard, x45265 or 488-9265.

2-Epson Matrix printers, 474-2339.

Commodore 64 keyboard, monitor & DD, assorted software, \$150. Jody, x37520 or 488-6917.

Musical

Yamaha 6-piece maplewood custom drumset w/ Zildjian symbols, \$1650; Remo Rotor Toms, \$95; '52 Fender Telecaster reissue, made in USA, pro quality, blonde w/black pick guard. Pat, x35180 or 326-3706.

Wurlitzer spinet piano, \$300. 326-2307.

Kawai FS-660 keyboard, 61 std keys, 100 tones, 50 patterns, programmable, \$150 OBO. 482-5190.

Boston Upright piano, good cond, x45035 or 334-4124.

Antique Hammond piano, good cond, \$700. Fran, x34840.

Pets & Livestock

Red Headed Gouldian Finches, males, 4/mo, clean & healthy, \$50/ea. Robin, x47471 or 331-4030.

Free 6 yr old blonde cocker spaniel mix dog, female, spayed, all shots; 2 1/2 yr old black & white border collie mix, male, neutered, all shots. Gloria, x31891 or 538-2283.

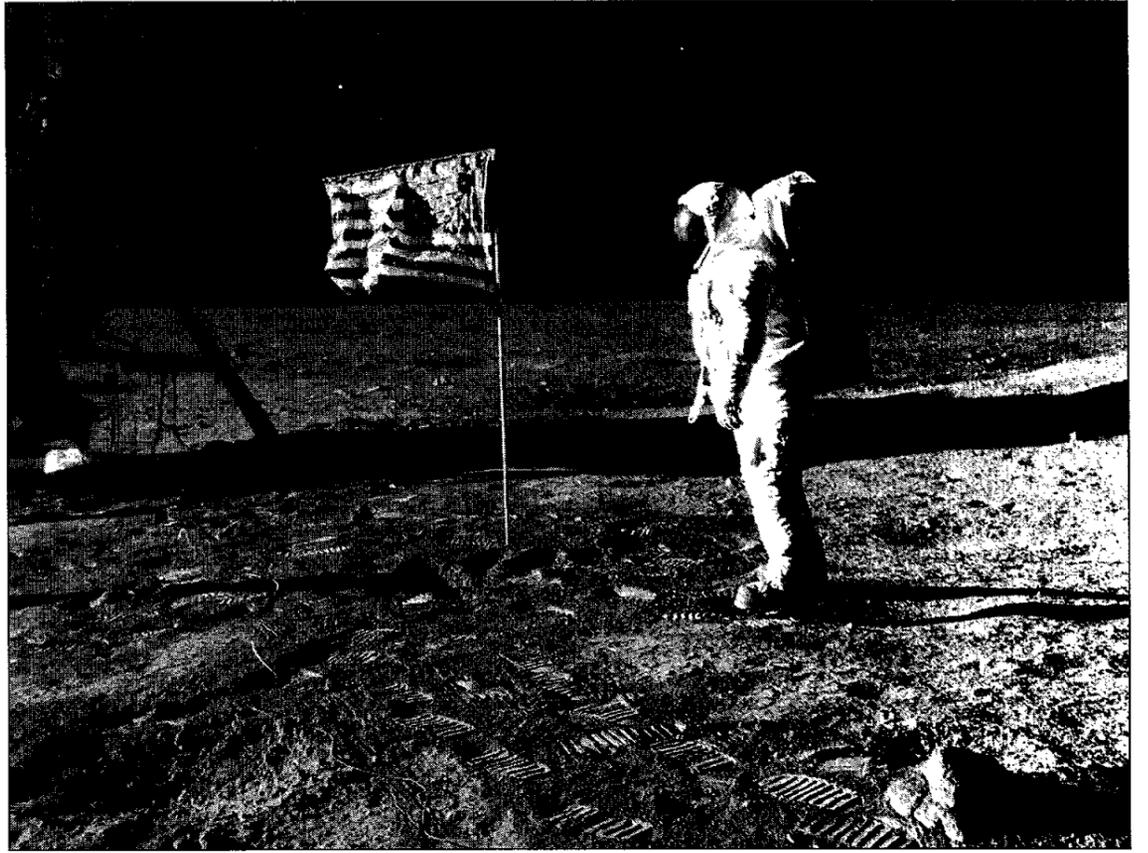
Male & female CKC reg Border Collie pus, 7 mo old. papers & shot record, \$175. x36814 or 554-2955.

Household

White crib/mattress, \$70; high chair, \$35; play pens, \$20, \$10; daybed w/trundle/mattress, \$150; daybed cover/access, purple hearts/lace, \$40 set; 4 drawer dressers, \$70, \$40, \$30 OBO all. Tina, x39727 or 286-2628.

Full sz W/D, older models, good working cond, \$25 ea; gas range, brn. old but works well, \$25, 474-5645.

Kg sz waterbed w/high mirrored hdbd and dbl under-dresser, \$600; matching armoire, \$530, all ex cond. Brian, 333-



Where no flag has gone before

By Annie Platoff

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Editor's Note: Annie Platoff is an information specialist at JSC. This article is excerpted from her NASA Contractor Report 188251.

For many people, one of the most recognizable Apollo 11 photographs is the image of astronaut Buzz Aldrin with the U.S. flag on the Moon. What few people know is that the flag almost didn't make the trip.

American flags have decorated spacecraft and launch vehicles since the U.S. Mercury program of the 1960s. They first appeared on spacesuits when Gemini astronaut, Edward White, took America's first spacewalk on June 4, 1965.

But use of flags in the space program became controversial when it was clear that a flag would be planted on the Moon. The United States signed the United Nations Outer Space Treaty in 1967, in which signatories agreed not to claim ownership of the Moon. Because flags traditionally were used to claim territory, NASA was concerned that placing a flag on the Moon would spark an international debate, which led NASA to consider a United Nations flag for the flight.

A committee was formed to select symbolic activities that would: 1) not jeopardize crew safety nor interfere with mission objectives; and 2) symbolize the first lunar landing as an "historic forward step of all mankind that has been accomplished by the United States" and that would not give the impression that the United States was "taking possession of the Moon" in violation of the Outer Space Treaty.

The committee considered the possibilities of leaving a U.S. flag or an adaptation of the solar wind experiment in the form of a flag, leaving a set of miniature flags of all nations and leaving a commemorative marker on the surface.

Following these deliberations, NASA decided use only the U.S. flag and to leave a plaque bearing the inscription "Here men from the planet Earth first set foot upon the Moon July 1969, A.D. We came in peace for all mankind." That message was mounted on the lunar landing module. The original plaque design

featured a U.S. flag, but the image was changed to show the eastern and western hemispheres of Earth, indicating the spacecraft's origins.

Work on the lunar flagpole, known as the lunar flag assembly, started about three months before Apollo 11's liftoff. NASA engineers had to consider a number of limitations when designing a flag for the Moon.

Because the Moon has no atmosphere, hence no wind, the flag assembly included a horizontal crossbar to give the illusion of a "flying" flag. Two other major limitations were the weight of the flagpole and stowage constraints. The entire assembly was made as lightweight as possible, nine pounds, seven ounces. The flag-carrying package size was reduced by developing a two-part telescoping flagpole with a telescoping crossbar. Also, the flagpole had to be easily assembled and set up by astronauts wearing pressurized spacesuits that made grasping objects difficult.

To make the flag assembly, a three-by-five-foot nylon flag was altered by sewing a hem along the top. The crossbar, hinged to the pole, went through this hem, and a loop sewn around the bottom of the flag secured it to the pole.

The flag assembly was mounted on the left-hand side of the Lunar Module ladder for easy access during the Moon walk. This helped reduce the amount of equipment to be carried inside the crowded spacecraft, but presented space engineers with an even more difficult challenge: how to protect the flag during the descent to the surface. It was estimated that the Lunar Module's descent engines would heat the ladder to 250 degrees Fahrenheit as they fired during the descent phase. And, for some 13 seconds of touchdown, the ladder would experience temperatures up to 2,000 degrees.

Tests determined that the flag could withstand only 300 degrees, so a protective shroud was designed for the flag assembly.

The flag assembly and shroud were built at the Manned Spacecraft Center — now JSC. Tubing used in the pole's construction was about one inch in diameter with a wall approximately 1/32 of an inch thick. The tubing was electrolytically coated to give it a gold color and a stiff protective surface. The lower section's base had a hardened steel point to make it easier to drive into the lunar soil.

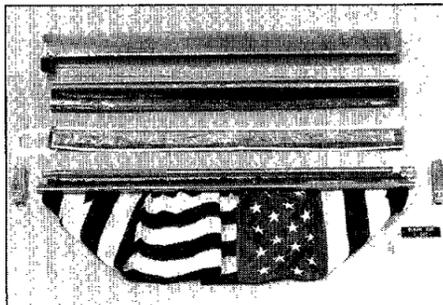
Five people tightly packed the flag assembly into the thermal package. It was closed with a Velcro strip that had a pull-tab at the top to make it easier for the astronauts to open on the lunar surface.

The thermal package was installed into the metal shroud and a small block of insulation was placed around the bottom and top of the pole to protect the flag from hot brackets. Once the package was properly stowed inside the shroud, it was taken to the launch site and mounted on the ladder

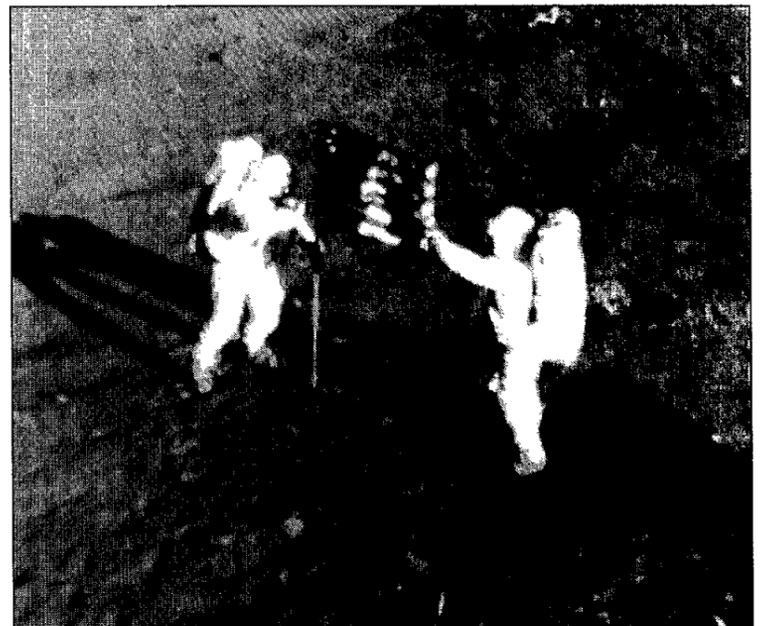
of the Lunar Module as the spacecraft sat atop its Saturn V booster ready for launch.

During the Moon walk, the astronauts extended the telescoping crossbar and raised it first to a position just above where it was parallel to the ground. Then the crossbar was lowered to a position perpendicular to the pole where a catch prevented the hinge from moving. The astronauts slipped the upper portion into the base portion of the flagpole. The flagpole was driven into the ground using a hammer brought along to sample lunar rocks. A red ring painted around the base of the flag assembly, 18 inches from the bottom, allowed the astronauts to judge the base's depth in the lunar soil.

The flag's manufacturer remains a mystery. Several nylon flags reportedly were purchased by NASA secretaries during their lunch hours in the area around the Manned Spacecraft Center. It also is possible that the Apollo 11 flag was one of several purchased at a cost of \$5.50 from a Government Stock Catalog.



Clockwise from top: 1) Dave McCraw, deputy for center technical services at the Manned Spacecraft Center, holds both portions of the flag destined for the Moon. 2) Apollo 11 astronaut stands beside the flag on the surface of the Moon. 3) The flag assembly, prior to packing. 4) Buzz Aldrin and Neil Armstrong place the flag on the Moon. 5) NASA engineers pack the flag assembly.



Contractors join to develop high-speed aircraft technology

Boeing Commercial Airplane Group and McDonnell Douglas Aerospace are teaming up to develop technologies for a potential future U.S. High-Speed Civil Transport aircraft as part of a NASA contract awarded July 15.

This precedent-setting action joins Boeing with McDonnell Douglas and other companies to develop airframe technologies for aerodynamics, flight systems and materials and structures.

The HSCT, a commercial supersonic aircraft, could fly 300 passengers across the Pacific or Atlantic Oceans at 2.4 times the speed of sound — cutting travel time by more than half. The new aircraft will fly faster than the Concorde, go nearly twice as far and be able to carry three times as many passengers.

"Developing the technologies for a future supersonic airliner that will be environmentally friendly and economically successful presents a major challenge and opportunity,"

said Louis Williams, director of NASA's High-Speed Research Program. "This contract effectively combines the expertise and capabilities of U.S. industry to accomplish this goal," Williams said.

Boeing has proposed that McDonnell Douglas serve as the company's principle subcontractor. By working together under a single contract, the two companies will be able to reduce redundancies, lower costs and accelerate research, ensuring that the United States remains at the forefront in commercial aerospace competition.

Boeing and McDonnell Douglas, along with General Electric Corp. and Pratt & Whitney, previously had competed with NASA via separate contracts in the first phase of the High Speed Research Program. Phase I was aimed at developing technologies to address important environmental issues such as the reduction of noise and engine emissions.

Progress made in the initial phase of the program has led to Phase II of the program, which focuses on moving technology concepts out of the laboratory and into practical applications.

The second phase also will include performance evaluations of representative engine components, structural verification tests of new engine and airframe materials and flight tests of better wing designs and new cockpit technology.

In June, NASA awarded Honeywell, Inc. \$75 million to conduct flight deck systems research and technology development for the potential HSCT, and last year the agency selected GE and Pratt & Whitney to negotiate a contract for propulsion technologies.

The flight deck systems effort will develop controls, guidance and synthetic vision technology, such as might be used to allow the pilot to fly the aircraft in all weather conditions with a "no-nose-droop" design, a

significant improvement over the first generation Concorde.

The main objective of the aerodynamics effort is to develop technology to increase the supersonic and subsonic cruise performance of the potential transport. Researchers will use wind tunnels and computational techniques to look at several different designs for the transport's components, primarily the wing and the horizontal tail. Researchers in materials and structures will develop new metallic alloys and composite materials for the airframe that can withstand temperatures of up to 350 degrees Fahrenheit at cruise speeds. Also, researchers will develop technology to produce wing and fuselage structures that are 33 percent lighter in weight than comparable Concorde structures, while also economical to manufacture and highly durable.

The HSR program, begun in 1990, is the cornerstone of NASA aeronautics research for the 1990s.

Funding for the agency's program, which addresses only high-risk, high-priority technology, totaled \$197 million this fiscal year, with comparable investments planned through the end of the century. American industry is making parallel investments to complete the high-risk technology, and they will decide whether building a next-generation supersonic transport makes good business sense.

NASA's Office of Aeronautics directs the High-Speed Research program. Langley Research Center is the agency's lead center for overall technical project implementation, with Lewis Research Center leading the propulsion technology development.

Dryden Flight Research Center is working on laminar flow control, flight testing and sonic boom research for the HSR program, while Ames Research Center is working on flight deck technology, sonic boom and aerodynamics research.

Teams key to success

(Continued from Page 1)

every milestone we had set up and I think this is a great tribute to you. You did your job, you did what you said you would do and you made our job easy in Washington."

Goldin also credited the unprecedented commitment to the space station program by President Clinton and Vice President Gore with favorably affecting the outcome of the vote.

But, Goldin reminded employees, considerable hard work remains in the upcoming year to meet NASA's commitments to the space station program. He acknowledged that the annual appropriations process can be "stressful and debilitating" for all involved and he encouraged team members to be personally committed to the success of the program.

"If we don't do what we say we are going to do, we will impact the whole NASA program," Goldin said. "And we in America also will have a very adverse impact on the space program in the rest of the world."

"I don't say this lightly, this is very important... the ability of future generations to share in this noble endeavor depends on what you do these next few years."

Goldin also said that all space station team members should have a milestone chart in their office that says "These are the things I'm responsible for. I will make the space station happen."

Pre-K openings at Child Care Center

JSC's Child Care Center will have several openings in its Pre-K program beginning Aug. 15.

JSC employees who have children entering kindergarten in Fall, 1995 should contact Georgia Strain, at x34734 for enrollment information.

Tuition assistance also is available.



JSC Photo by Robert Markowitz

CHILDREN'S CONCERT — Two children wait eagerly for the entertainment to begin as Tonja Evetts Weimer, children's folk artist and educator, performed for them at Teague Auditorium June 27. Weimer performed a selection of children's songs on her Autoharp. She was inspired to record an album of space-oriented children's songs after witnessing a shuttle launch in 1992.

Science capability enhanced

(Continued from Page 1)

rather than to have the lab up in space and not have the power to adequately use it."

Brinkley said other key milestones have not been affected. "The first element launch has not changed. The Japanese experiment module launch has not been affected, and the assembly complete milestone is still June 2002."

"The early power capability will be achieved by taking a U.S. solar array, moving it up in the launch sequence, and attaching it to a small truss on top of the U.S. node," said Bill Shepherd, deputy manager, Space Station Program Office. Toward the end of the assembly sequence the solar array will be relocated to its permanent position at the end of the truss assembly.

The small truss will remain in place on the node and also will house control moment gyros and communication antennas. The labo-

ratory module flight is now set for November 1998, after the early solar array installation.

In addition to agreeing to the improved assembly sequence, the SSCB concurred with plans to purchase the power and propulsion module known as the "FGB" or "energy block" from Russia's Krunichev enterprise.

Purchase of the FGB assured its availability at the outset of station assembly and adds redundancy in guidance, navigation and control and reboost capability.

The board also baselined an assembly sequence that includes the European Space Agency's plans to launch its attached pressurized laboratory module on the European Ariane vehicle instead of the space shuttle.

The board is comprised of space station program management, international partners and Boeing space station team management.

Space agencies set to explore activities in space, Earth science

NASA and the National Space Agency of Ukraine, NSAU, agreed last week to explore possible cooperation in remote sensing and Earth sciences, telemedicine, space biology, space welding, advanced concepts and technology, and student and scientist exchanges.

The cooperative activities follow discussions held earlier this year between NASA Administrator Daniel Goldin and Ukrainian Deputy Prime Minister Valeriy Shmarov.

During August's Space Radar Laboratory mission, the Shuttle Imaging Radar will take images of sites in the Ukraine. NSAU also will conduct airborne radar surveys of these sites during the mission.

Discussions also were held on a possible joint project to study the Chernobyl region using U.S. Landsat imagery and various Ukrainian data from ground measurements and remote sensing platforms.

Potential cooperation in telemedicine may include computer connectivity, voice/fax, and videoconferencing capabilities for furthering medical science and medical education, as

well as the clinical telemedicine capabilities required for patient examinations and evaluations in Ukraine and the U.S. In the field of space biology, activities include data and scientist exchanges in flight- and ground-based research, biomedical research, flight hardware, access to space flight, unique ground facilities, science and technology application, and advanced life support.

A possible NASA/Ukraine Joint Flight Demonstration of the Ukrainian Universal Hand Tool also was discussed. If approved, NASA will lease the UHT from the Paton Institute. The institute is a world leader in space welding technologies which could offer viable techniques for assembly and repair of large space structures.

Discussions also focused on collaborating in the areas of advanced concepts and technology, especially in the areas of electrophoresis, protein crystal growth, organic separation, animal and plant productivity, environmental controls, agricultural biotechnology, and electron beam processing of metallic and semiconductor materials.

Interviewees hope for career as space shuttle astronauts

The third of about six groups of prospective astronauts will be at JSC next week for orientation, interviews and medical evaluations.

About 120 of the 2,962 applicants will be interviewed through August for a chance to be among approximately 20 named as astronaut candidates. The final selections will be announced in the fall with the new astronaut class reporting in early 1995. Those selected will join an international astronaut candidate representing Japan.

The third group of 20 applicants includes Michael Anderson, Plattsburgh AFB, NY; Thomas Barrera,

Los Angeles, CA; Carol Christian, Oakland, CA; Laurel Clark, Pensacola, FL; Ralph Cope, Newark, DE; Daniel Dixon, Lemoore, CA; A. Gordon Emslie, Huntsville, AL; Gabriel Font-Rodriguez, Somerville, MA; Patrick Forrester, JSC; Dominic Gorie, Orange Park, FL; Kathryn Hire, Merritt Island, FL; Arthur Kreitenberg, Los Angeles, CA; Larry Pepper, JSC; Donald Pettit, Santa Fe, NM; Michelle Rucker, Las Cruces, NM; Susan Still, Virginia Beach, VA; Mark Stucky, JSC; Thomas Sullivan, JSC; Cynthia Twohy-Ragni, Westminster, CO; and Susan Ying, Ames, IA.

NASA strategic plan stresses customer satisfaction

This article is one in a series from NASA headquarters.

The NASA Strategic Plan was recently distributed to all NASA employees and provided to our external customers.

The following is a summary of the NASA Strategic Plan and strategic management process which was acknowledged by Vice President Gore as one of the agency's significant "Reinvention Success Stories" during his June 15, 1994 visit to NASA.

NASA is adjusting to a fundamental paradigm shift as U.S. space efforts evolve from programs driven largely by Cold War competition to post-Cold War pro-

grams spurred by the need to contribute to national R&D goals. While we reinvent NASA, we aim to set the standard within the U.S. Government for excellence in strategic management.

The first step in strategic management is strategic planning, and the concept underlying NASA's Strategic Plan is customer focus. We recognize that our requirements can not be self-generated. Rather, we must carefully identify our customers and meet their needs. To this end, we have separated NASA's mission into five externally focused elements which we call Strategic Enterprises: Mission to Planet Earth, Aeronautics, Human Exploration and Development of

Space, Scientific Research, and Space Technology. Each Enterprise has its own strategic objectives, and each has a unique set of external customers. Each Enterprise will develop mechanisms for understanding the needs of its external customers, satisfy those needs, and obtain feedback in order to improve its performance. Our performance in carrying out our programs, i.e., our success as an agency, must be judged by our customers, not by ourselves.

The NASA Strategic Plan presents our top-level strategy. It clarifies our mission and also the fact that we must simultaneously address broader national needs. It articulates what we do and for whom; it differentiates

between ends and means; it states where we are going and how we will get there. When we get there will be dependent upon priorities and funding decisions established by the Administration and the Congress.

NASA's Strategic Plan reflects culture change not only in its content, but also in the methodology used to develop it. Over 7,000 NASA employees were involved in a year-long process to articulate our Vision, our Mission, and our Values. Using their statement as a starting point, NASA's entire Senior Management Team proceeded to develop a meaningful Strategic Plan. Under the leadership of the Administrator, the Senior Management Team will continue to be responsible

for NASA's strategic planning and for the strategic management decisions necessary to turn the Plan into reality.

The NASA Strategic Plan represents the culmination of many months' work at NASA. We believe that this effort, although arduous at times, has paid off—our product is a strong consensus document that provides a clear context for key management decisions regarding policy, strategy, and action. It establishes a framework for working with our customers to shape our activities and for developing a balanced set of budgetary priorities across the Agency. The Plan will keep focused on our long-term goals.